

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 9132WO/HF/KH	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/IB2003/003084	International filing date (day/month/year) 30.06.2003	Priority date (day/month/year) 28.06.2002
International Patent Classification (IPC) or national classification and IPC E21B 33/076		
Applicant ABB AS et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☒ (sent to the applicant and to the International Bureau) a total of 7 sheets, as follows:

☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 28.01.2004	Date of completion of this report 23.09.2004
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Christer Bäcknert / MRo Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IB2003/003084

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1 - 23 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* 24 - 30 received by this Authority on 17.08.2004
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 1 - 10 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IB2003/003084

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-27</u>	YES
	Claims	_____	NO
Inventive step (IS)	Claims	<u>1-27</u>	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	<u>1-27</u>	YES
	Claims	_____	NO

2. Citations and explanations (Rule 70.7)

The present invention is intended to make it possible to avoid the necessity of rigging an injector package with the coiled tubing or toolstring in the intervention of a subsea well. The problem is solved by providing an injector package that is connected to the well head and adapted to be connectible with a lubricator package and to forward a lubricator means through it in the connected state. Thus, the two packages are separated and there is no need to retract or lift-off the injector package when running the coiled tubing.

The claims have been amended in that features have been added to independent claims 1 and 19. These features concern a movable stripper/packer element (30) associated with lubricator pipe (13).

The invention defined in amended claims 1-27 is not disclosed by any of the documents cited in the International Search Report.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed well assembly for intervention of a subsea well or wellhead. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-27 is novel and is considered to involve an inventive step.

The invention is industrially applicable.

PATENT CLAIMS

1. A well assembly (2), for intervention of a subsea well (3) or a well head (4) by means of a wireline or a coiled tubing (7) connected to a tool or a toolstring (32), comprising lubricator means and an injector package (5), and in which
- 5 - said injector package (5) is adapted to inject the wireline or coiled tubing (7) into the well (3) or well head (4),
- said lubricator means (13, 29, 30) is adapted to be fitted in a lubricator package (6) and define a locking chamber via which said wireline or coiled tubing (7) is to be forwarded to the well (3) or well
- 10 head (4),
- said lubricator means (6) being adapted to be connected to said well head,
- said injector package (5), comprises an injector module (12), being adapted to be fitted to said well head,
- 15 and that the injector module (12) is adapted to forward said lubricator means (13, 29, 30) through it, when said packages are connected to each other and to the well head, for the purpose of injecting said wireline or coiled tubing (7) into the well (3) or well head (4),
- 20 **characterised in** that
- the lubricator means (13,29,30) comprises a lubricator pipe element (13) and an associated moveable stripper/packer element (30) adapted to be connected to a well barrier module (11b) on the well head (4).
- 25
2. A well assembly according to claim 1, **characterised in** that it further comprises a well barrier package (11),
- said well barrier package (11) being adapted to be fitted onto said well head (4),

- said injector package (5) being adapted to be fitted onto said well barrier package (11),
 - said lubricator package (6) being adapted to be fitted onto said injector package (5), and
- 5 that the injector module (12) is adapted to forward said lubricator means (13, 29, 30) through it, when said packages are connected to each other respectively and to the well head.
3. A well assembly according to claim 1 or 2, **characterised in** that
- 10 the injector package (5) is provided with a separate, preferably self-standing, injector module (12) through which of the lubricator means (13, 29, 30) is forwarded.
4. A well assembly according to any one of claims 1-3, **characterised**
- 15 **in** that the injector module (12) for forwarding the lubricator means (13, 29, 30) through it also is adapted to inject the wireline or coiled tubing (7) into the well (3) or well head (4).
5. A well assembly according to any one of claims 1-4, **characterised**
- 20 **in** that the lubricator package (6) comprises a hydraulic cylinder device (25) for forwarding and retracting the lubricator means (13, 29, 30) through the injector module (12) between an upper position above the injector module and a lower position below the injector module.
- 25 6. A well assembly according to any one of claims 1-4, **characterised**
- 30 **in** that the lubricator package (6) comprises a mechanical screw device (27), preferably hydraulically operated, for forwarding and retracting the lubricator means (13, 29, 30) through the injector module (12) between an upper position above the injector module and a lower position below the injector module.

7. A well assembly according to any one of claims 1-6, **characterised in** that the well barrier package (11) comprises an upper well barrier module (11b) arranged below the injector package (5), preferably being a part of the injector package (5).
- 5
8. A well assembly according to claim 7, **characterised in** that the well barrier package (11) also comprises a lower well barrier module or package (11a) arranged below the upper well barrier module (11b).
- 10 9. A well assembly according to any one of claims 1-8, **characterised in** that it comprises a remote-controlled coupling device (20), preferably arranged in the interface section between the lubricator package (6) and the injector package (5), for connecting/disconnecting the lubricator means (13, 29, 30) at its upper position,
- 15 and a corresponding coupling device (21), preferably arranged in the upper well barrier module (11b) for connecting/disconnecting the lubricator means (13, 29, 30) at its lower position.
10. A well assembly according to any one of claims 1-9,
- 20 **characterised in** that the injector module (12) comprises at least two driving elements (17, 18) by means of and between which the coiled tubing (7), after the retraction of the lubricator means (13, 29, 30) through the injector module (12), is injected into the well (3) or well head (4), the spacing between said driving elements (17, 18) being
- 25 adjustable so as to engage the driving elements (17, 18) and the coiled tubing (7) during the injecting operation of the injector module (12).
11. A well assembly according to any one of claims 1-10,
- 30 **characterised in** that the lubricator means (13, 29, 30) comprises a lubricator pipe element (13), a fixed stripper/packer element (29) that

is arranged in the upper part or end of the lubricator pipe element (13), and an associated moveable stripper/packer element (30).

12. A well assembly according to claim 11, **characterised in** that the
5 moveable stripper/packer element (30) is adapted to feed and retract the coiled tubing (7) together with the tool assembly or toolstring (32) through the lubricator pipe element (13).

13. A well assembly according to claim 11 or 12, **characterised in**
10 that each one of the fixed stripper/packer element (29) and the moveable stripper/packer element (30) is sealingly arranged around the coiled tubing (7) and between itself and the lubricator pipe element (13).

14. A well assembly according to any one of claims 11-13,
15 **characterised in** that said moveable stripper/packer element (30) is adapted to be placed and preferably locked either in an upper position above the injector module (12) by means of coupling device (20), or to the well barrier module (11b) in a lower position below the
20 injector module (12) by means of the coupling device (21).

15. A well assembly according to claims 14, **characterised in** that
the moveable stripper/packer element (30) remains in place at and preferably locked to the coupling device (21) of the well barrier
25 module (11b) while the lubricator pipe element (13) is retracted to said upper position.

16. A well assembly according to any one of claims 1-15,
characterised in that the coiled tubing (7) is connected to a floating
30 vessel (1) that comprises means (37) including a surface injector (38) and an associated coiled tubing reel (39) for feeding out the coiled

tubing (7) from the vessel and for retracting the same to the vessel (1).

17. A well assembly according to claim 16, **characterised in** that the
5 coiled tubing is freely extending in the water with a tension defined
by the system between the surface injector (38) and the injector
module (5).

18. A well assembly according to any one of claims 1-17,
10 **characterised in** that the vessel (1), injector package (5) and the
wireline or coiled tubing (7) extending between them form a passive
system that permits substantial movement of the vessel (1) in relation
to the well head (4).

15 19. A method for injecting a wireline or coiled tubing (7) into a subsea
well (3) or well head (4), comprising the steps of:

- connecting an injector package (5), comprising an injector module (12) for injecting the wireline or coiled tubing (7) into the well or wellhead, to the well head (4),
- 20 - forwarding lubricator means (13, 29, 30) adapted to be fitted in a lubricator package (6), through the injector module (12) when said packages are connected to each other and the well head, said lubricator means comprising a lubricator pipe element (13) and an associated moveable stripper/packer element (30) which is adapted to
25 be connected to a well barrier module (11b) on the well head (4),
- connecting said lubricator means (13, 29, 30) defining a locking chamber via which the coiled tubing (7) is forwarded to the well or well head, to the well head (4),
- connecting the moveable stripper/packer element (30) to said well
30 barrier module (11b)
- retracting the lubricator pipe element (13) through the injector module (12), and

- injecting said wireline or coiled tubing (7) by means of the injector module (12) into the well (3) or well head (4).

20. A method according to claim 19, **characterised in** that
- 5 a well barrier package (11) is connected onto the well head (4).
- said injector package (5) is connected onto the well barrier package (11),
- said lubricator package (6) is connected onto the injector package (5), and that
- 10 - said lubricator means (13, 29, 30) is forwarded through the injector module (12) when said packages (11, 5, 6) are connected to each other and to the well head (4).

21. A method according to claim 20, **characterised in** that the
- 15 wireline or coiled tubing (7) is forwarded through the lubricator means (13, 29, 30) and connected to the well head (4) when the lubricator means (13, 29, 30) has been connected to the well barrier package (11).

- 20 22. A method according to claim 21, **characterised in** that, when the coiled tubing (7) has been connected to the well head (4), the lubricator means (13) is disconnected from the well barrier package (11) and retracted through the injection module (12) such that it is displaced in relation thereto.

- 25 23. A method according to claim 22, **characterised in** that, when the lubricator means (13, 29, 30) has been retracted, the injector module (12) is used for injecting the coiled tubing (7) by means of driving elements (17, 18) into the well (3).

30

24. A method according to any one of claims 19-23, **characterised in** that the injector module (12) is also used for retracting the coiled tubing (7) out of the well (3).
- 5 25. A method according to any one of claims 20-24, **characterised in** that the lubricator means (13, 29, 30) is forwarded from its retracted position and connected to the well barrier package (11) before the coiled tubing (7) is disconnected from the well head (4).
- 10 26. A method according to any one of claims 19-25, **characterised in** that the coiled tubing (7) and the lubricator package (6) are removed or disconnected as one single unit or separately from the injector package (5).
- 15 27. A method according to any one of claims 19-26, **characterised in** that the coiled tubing (7) is arranged with a tension defined by the system, extending from a surface injector (38) to the injector module (12).